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Social isolation and its influencing factors among age-related hearing loss patients

A cross-sectional study

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Abstract

Hearing loss is considered one of the most common symptoms of aging worldwide, and age-related hearing loss is one of the three major chronic illnesses that affect older adults. This study examined social isolation among age-related hearing loss patients and its influencing factors. This cross-sectional descriptive study collected data from older adults with hearing loss from March 2019 to February 2020 at a university hospital. Social isolation, subjective hearing handicap, and communication-related life satisfaction were measured using a structured questionnaire. Objective hearing function was evaluated using an audiometer (Madsen Asterao 2). The independent *t* test, one-way analysis of variance, and multiple linear regression analysis were used to analyze the data. The Strengthening the Reporting of Observational Studies in Epidemiology checklist was used for reporting this study. Almost half (49.9%) of 203 age-related hearing loss patients aged 60 to 92, with a mean age of 71.6 ± 7.95 years, experienced social isolation. Factors predicting social isolation were communication-related life satisfaction ($P < .001$), religiosity ($P = 001$), experience using hearing aids ($P = .006$), and subjective hearing handicap ($P = .047$). The explanatory power of the model was 58.2%. Interventions to reduce social isolation among age-related hearing loss patients should be implemented in an effort to develop effective, appropriate, and comprehensive strategies targeting this high-risk group.

Abbreviation: KESHH = Korean Evaluation Scale for Hearing Handicap.

Keywords: aged, communication, hearing loss, social isolation

1. Introduction

1.1. Background

Hearing loss is one of the most common symptoms of aging worldwide, and age-related hearing loss is one of the three major chronic illnesses, along with hypertension and arthritis, that affects older adults.[1] In South Korea, the number of age-related hearing loss patients is rapidly increasing by an average of 5% or more every year, and approximately 45% of patients develop hearing loss at the age of 60 years or older.[2] In the United States, hearing loss was found to be closely related to aging in most hearing loss patients, who made up approximately 13% of the total population.[1] According to data from the Ministry of Health and Welfare on the prevalence of hearing loss in South Korea, there was an estimated total of 1.7 million age-related hearing loss patients (25%–40% of people between 65 and 75 years of age and 38%–70% of people older than 75 years of age) among 7.75 million older patients aged 65 years or older in 2019.[2] With the rapid aging of the South Korean population, which parallels the rapid aging of the populations of other countries, those aged 65 years and older will comprise an estimated 46.5% of the total population of South Korea in 2067.[3] These reports suggest that the number of age-related hearing loss patients will also significantly increase.

Age-related hearing loss is the most common type of sensorineural hearing loss and is caused by the aging of the hearing organs.[4,5] Word recognition decreases due to the decreased processing of sound stimuli by the central nervous system along with an increased hearing threshold, mainly in the high-frequency ranges. Age-related hearing loss is more common in men than in women.[4,5] Decreased hearing function causes difficulty hearing in background noise and multi-speaker situations. This hinders communication with others and leads to various psychological and social disorders, resulting in a significant negative impact on quality of life.[5–7] However, older adults often consider hearing loss to be a natural part of the aging process, and many older patients gradually distance

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themselves from social activities rather than actively treat their hearing loss.[8] In previous studies, age-related hearing loss was significantly associated with increased loneliness and social isolation in older adults.[5–7] Unlike depression, which is recognized as a severe mental health issue, social isolation in old age is often considered natural, and its severity may be misunderstood. However, recent studies have found that social isolation in older adults is a crucial factor for triggering mental, cognitive, and functional disorders, as well as a predictor of increased mortality, all of which results in increased medical expenses for older adults.[5–7] Social isolation tends to be more severe for people with age-related hearing loss.[5] Therefore, active and professional interventions, including hearing rehabilitation, should be implemented to reduce social isolation and enhance the social participation of age-related hearing loss patients.

A systematic review of hearing loss and social isolation found hearing loss to be highly significantly associated with social isolation, and people with severe hearing loss (especially women with hearing loss) were more likely to experience social isolation.[5] It is generally understood that people with hearing loss are at a higher risk of social isolation than people without hearing loss.[5] However, there have been few studies on the degree of social isolation among age-related hearing loss patients in South Korea and its influencing factors.

Therefore, this study aimed to determine the degree of social isolation, hearing handicap, and communication-related life satisfaction among age-related hearing loss patients and investigate their relationships and the factors that influenced social isolation.

1.2. Purpose

The purpose of this study was to identify the correlations between the degree of social isolation, communication-related life satisfaction, and subjective hearing handicap index in age-related hearing loss patients. This study also aimed to identify the factors that influenced social isolation in age-related hearing loss patients.

2. Methods

2.1. Study design

This was a cross-sectional descriptive study to identify factors that influenced social isolation in age-related hearing loss patients.

2.2. Participants

The participants in this study were patients who visited the outpatient otorhinolaryngology department whose primary complaint was hearing loss and who underwent audiometry at a university hospital from March 25, 2019, to February 7, 2020. The selection criteria were patients aged 60 years or older with sensorineural hearing loss with a hearing threshold of 26 dB HL or higher at 0.5, 1, 2, and 4 kHz as determined by audiometry; symmetrical hearing loss in both ears; and hearing loss caused by aging as determined by an otolaryngologist and patients who were able to read and understand Korean to complete a questionnaire. Patients with cognitive impairment or who were unable to communicate and those treated for other acute diseases were excluded. In order to calculate the minimum number of participants, multiple linear regression analysis was conducted with a significance level of .05, median effect size of .15, power of 90%, and 21 predictors (demographic and health-related characteristics, hearing function, and communication-related life satisfaction) using G*Power 3.1.9.2. The minimum sample size was determined to be 171. To account for a potential 20% dropout rate, a total of 205 patients participated in the survey. Data from 203 patients were used for the final analysis after excluding data from two more patients who provided insufficient responses.

2.3. Instruments

2.3.1. General and health-related characteristics of participants. The general and health-related characteristics of the participants were determined through a literature review of previous studies. They included sex, age, religiosity, education level, marital status, living arrangement, monthly income, alcohol consumption, perceived health status, chronic illness, duration and degree of hearing loss, and experience using hearing aids. Audiometry results were obtained from medical records.

2.3.2. Social isolation. Social isolation was measured using a tool originally developed by Oh[9] and used by Gong[10] after receiving approval from the developer. The scale consists of 6 items in a single domain rated on a 5-point Likert scale, with answers ranging from 1 point ("not at all") to 5 points ("very much"). Total possible scores range from a minimum of 5 points to a maximum of 30 points, and a higher total score indicates greater social isolation. In this study, participants who responded "much" or "very much" to each item were considered to experience social isolation. The Cronbach α-value in the study by Gong[10] was .85 and .96 in this study.

2.3.3. Hearing function assessment.

2.3.3.1. Subjective hearing handicap. Subjective hearing handicap was measured using the Korean Evaluation Scale for Hearing Handicap (KESHH) questionnaire developed by Ku and Kim[11] after receiving approval from the developer to analyze the degree of perceived handicap due to geriatric hearing loss. The scale contains 24 items across 4 subdomains (social domain, 6 items; psycho-emotional domain, 6 items; interpersonal domain, 6 items; and perception of hearing aids, 6 items) rated using a 4-point Likert scale, with possible answers ranging from 1 point ("never") to 4 points ("frequently"). A higher total score indicates a greater degree of subjective hearing handicap. In this study, participants who responded "occasionally" (3 points) or "frequently" (4 points) to each item were considered to have a hearing handicap, and those who responded "never" (1 point) or "rarely" (2 points) to each item were considered not to have a hearing handicap. The Cronbach α-value at the time of development was .92, and it was .91 in this study. The Cronbach α values of the subdomains in this study were .95, .91, .92, and .89 for the social, psycho-emotional, interpersonal, and perception of hearing aids domains, respectively.

2.3.3.2. Objective hearing function. In order to objectively assess hearing function, audiometry data collected from the outpatient otorhinolaryngology department of a university hospital were used. An audiologist conducted audiometry tests using the Madsen Astera 2 audiometer (Otometrics A/S, Denmark). The audiometry test measured the hearing level of both ears at 4 frequencies (0.5, 1, 2, and 4 kHz), and the mean value was used for the analysis.[5] Hearing thresholds were categorized as normal (≤25 dB HL), mild hearing loss (26–40 dB HL), moderate hearing loss (41–55 dB HL), moderate-severe hearing loss (56–70 dB HL), severe hearing loss (71–90 dB HL), and profound hearing loss (≥91 dB HL).[5]

2.4. Communication-related life satisfaction

The communication satisfaction level was measured using the American Speech-Language-Hearing Association, Quality of

Communication Life Scale, which was originally developed by Paul et al[12] and translated into Korean by Choi et al[13] The scale consists of 18 items, with 17 items across 4 subdomains (confidence and autonomy in communication, roles and self, participation in daily activities, and interaction with others) and 1 item on the overall quality of life. The items are measured on a 5-point Likert scale with answers ranging from 1 point ("strongly disagree") to 5 points ("strongly agree"), and a higher total score indicates higher communication-related life satisfaction. In this study, participants who responded "agree" (4 points) or "strongly agree" (5 points) were considered to have good communication satisfaction, while those who responded "somewhat" (3 points) were considered to have moderate communication satisfaction and those who responded "strongly disagree" (1 point) or "disagree" (2 points) were considered to have poor communication satisfaction. The Cronbach α value in the study by Choi et al[13] was .85, and it was .96 in this study. The Cronbach α values of the subdomains in this study were.88 for confidence and autonomy in communication, .87 for roles and self, .92 for participation in daily activities, and.91 for interaction with others.

2.5. Ethical considerations

Data collection was conducted with the consent and cooperation of the institution after obtaining approval from the institutional review board of the researcher's previous affiliated Konyang university (IRB No. 2019-193-01). The collected data were only assessed by the participating researchers, and all research-related documents were sealed and stored in a double-locked location. The collected data were anonymized and coded, and the participants were notified that the data would not be used for any purpose other than research and would be shredded and discarded after a retention period of 3 years after the completion of the research. Written informed consent was obtained from all participants.

2.6. Data collection

In order to collect the data, one nurse and 2 research assistants who understood the characteristics and health of age-related hearing loss patients were recruited, shown how to obtain written consent, and given the details of the survey. Clear criteria and protocols for the survey were generated to minimize differences between the results according to the data collector. In order to ensure reliability, a preliminary survey was conducted for 5 of the same participants, and a consensus was obtained about the assessment outcomes. Written consent was obtained and the survey was completed in individual, one-on-one interviews. The surveys took approximately 15 to 20 minutes to complete.

2.7. Data analysis

The collected data were analyzed using SPSS for Windows (version 21.0; IBM Corp., Armonk, NY). Descriptive statistics (means, standard deviations, and percentages) were calculated for all variables, including skewness for normality and Cronbach α for reliability. Social isolation according to the participants' characteristics was analyzed using the independent *t* test and 1-way analysis of variance, and Scheffé post hoc test was performed. Pearson correlation coefficient was used to examine the correlations between social isolation, subjective hearing handicap, and communication-related life satisfaction. The factors that influenced social isolation were identified using multiple linear regression. Significance was set at $P < .05$.

3. Results

3.1. Degree of social isolation of the participants

The mean score for social isolation among the participants was 20.66 ± 5.16. The percentages of participants who responded that they experienced social isolation was 49.9%; indicated by a mean score of 4 points or higher for each item (Table 1).

3.2. Social isolation according to participants' characteristics

The mean age of the participants was 71.6 ± 7.95 years, and the highest proportion of participants were aged 60 to 69 years (n = 87, 42.9%). More than half of the participants were women (n = 121, 59.6%). Differences in social isolation according to the participants' characteristics showed significant differences for religiosity ($P = .001$), living arrangement ($P < .001$), perceived health status ($P < .001$), total duration of hearing loss ($P < .001$), objective hearing function ($P < .001$), experience using hearing aids ($P < .001$), subjective hearing handicap ($P < .001$), and communication-related life satisfaction ($P < .001$) (Table 2).

3.3. Correlation between subjective hearing handicap, communication-related life satisfaction subdomains, and social isolation

There was a significant positive correlation between hearing handicap indices in the social ($P < .001$), psycho-emotional ($P < .001$), interpersonal ($P < .001$), and perception of hearing aids ($P < .001$) domains of subjective hearing handicap and social isolation. The communication-related life satisfaction domains (confidence and autonomy in communication [$P < .001$]; roles and self [$P < .001$]; participation in daily activities [$P < .001$]; and interaction with others [$P < .001$]) showed significant negative correlations with social isolation (Table 3).

3.4. Factors that influenced social isolation in age-related hearing loss patients

In order to determine which factors influenced social isolation, multiple regression analysis was conducted using the variables for which a statistically significant correlation with social isolation was found in the univariate analysis (Table 4). Subjective hearing handicap and communication-related life satisfaction were treated as continuous variables, and religiosity, subjective health status, total duration of hearing loss, experience using hearing aids, and objective hearing function

Table 1

Social isolation in age-related hearing loss patients (N = 203).

Items		*M* ± SD	≥ 4 points (%)
1	I usually think I'm a failure.	3.13 ± .98	43
2	I feel depressed, sad, and unable to get by.	3.54 ± .86	51.7
3	Even with my children, I feel a sense of distance.	3.48 ± .97	52.2
4	I think I'm alone in this world.	3.47 ± 1.03	50.7
5	I feel that life is often boring.	3.55 ± .97	54.6
6	I find it burdensome to be with people.	3.48 ± .98	47.3
	Total score (min-max)	20.66 ± 5.16 (10–30)	

M = mean, SD = standard deviation.

Table 2

Social isolation according to the characteristics of participants (N = 203).

Variables	Categories	n (%)	*M* ± SD	Social isolation	
				Mean ± SD	*t* or *F* (*P*)
Gender	Male	82 (40.4)		19.8 ± 4.43	−1.95 (.053)
	Female	121 (59.6)		21.2 ± 5.55	
Age (yr)	60–69	87 (42.9)	71.6 ± 7.95	20.4 ± 5.16	.37 (.695)
	70–79	79 (38.9)		20.6 ± 5.11	
	≥80	37 (18.2)		21.3 ± 5.33	
Religiosity	Yes	147 (72.4)		19.9 ± 4.91	−3.25 (.001)
	No	56 (27.6)		22.5 ± 5.38	
Education level	No education	15 (7.4)		20.9 ± 4.0	
	Elementary school	35 (17.2)		22.2 ± 5.47	2.4 (.069)
	Middle school	123 (60.6)		20.63 ± 5.04	
	High school				
	College	30 (14.8)		18.8 ± 5.39	
Marital status	Married	196 (96.6)		20.6 ± 5.15	−1.45 (.149)
	Unmarried	7 (3.4)		23.4 ± 5.16	
Living arrangement	Living alone*	66 (32.5)		23.0 ± 5.07	11.10 (<.001)
	Living with spouse*	86 (42.4)		19.56 ± 5.02	a > b,c*
	Living with offspring*	51 (25.1)		19.47 ± 4.55	
Monthly income (USD)	<400	83 (40.9)		21.58 ± 5.14	2.38 (.071)
	≥400–<800	47 (23.2)		20.87 ± 5.08	
	≥800–<1600	54 (26.6)		19.69 ± 5.38	
	≥1600	19 (9.4)		18.84 ± 4.20	
Alcohol consumption	Yes	109 (53.7)		20.0 ± 4.84	−1.79 (.740)
	No	94 (46.3)		21.35 ± 5.44	
Perceived health status	≥Fair	72 (35.5)		18.81 ± 4.54	−3.92 (<.001)
	Poor	131 (64.5)		21.7 ± 5.22	
Chronic illness	Yes	167 (82.3)		20.95 ± 5.13	1.77 (.078)
	No	36 (17.7)		19.28 ± 5.15	
Dwelling type	Attached house	90 (20.37)		20.37 ± 4.72	−.71 (.479)
	Detached house	113 (20.88)		20.88 ± 5.50	
Total duration of hearing loss (months)	<6*	27 (13.3)		18.22 ± 4.73	11.33 (<.001)
	6–12*	36 (17.7)		18.19 ± 4.62	c > a,b*
	>12*	140 (69.0)		21.76 ± 5.03	
Objective hearing function: level of hearing loss	Mild*	14 (6.9)		18.43 ± 4.09	17.49 (<.001)
	Moderate*	110 (54.2)		19.05 ± 4,53	e > a,b,c*
	Moderately severe*	38 (18.7)		20.84 ± 4.67	
	Severe*	27 (13.3)		24.56 ± 4.46	
	Profound*	14 (6.9)		27.43 ± 3.84	
Experience using hearing aids	Yes	42 (20.7)		23.4 ± 4.72	3.94 (<.001)
	No	161 (79.3)		20.0 ± 5.05	
Subjective hearing handicap	Yes	135 (33.5)	77.68 ± 11.87	22.37 ± 4.87	−7.53 (<.001)
	No	68 (66.5)		17.25 ± 3.89	
Communication-related life satisfaction	≥Fair	150 (73.9)	45.97 ± 14.34	19.01 ± 4.38	9.06 (<.001)
	Poor	53 (26.1)		25.32 ± 4.3	

HL = hearing loss, *M* = mean, SD = standard deviation, USD = United States dollar.
*Scheffé's test: post-hoc analysis.

were treated as dummy variables. The regression equation was found to be statistically significant ($F = 36.96$, $P < .001$), and the Durbin–Watson statistic of the model was 2.15, which was close to 2 and thus satisfied the independence of residuals. Factors influencing social isolation were communication-related life satisfaction ($P < .001$), religiosity ($P = 001$), experience using hearing aids ($P = .006$), and subjective hearing handicap ($P = .047$). The explanatory power of the model was 58.2%.

4. Discussion

This study was conducted to investigate differences in social isolation according to the participants' demographic and health-related characteristics and to identify correlations between major variables and factors that influenced social isolation.

In this study, the mean score for social isolation among the participants was 20.66 (range: 5–30), and 49.9% of the participants experienced social isolation. This percentage is slightly higher than that of older adults who live in large cities and use welfare centers in South Korea (39.4%),[14] older adults who live in urban-rural complexes in small and medium-sized cities (26.4%),[15] and older adults in the United States (24%).[16] This difference may be due to differences in the participants and the way social isolation was measured. However, despite the limitations when comparing the findings to those of other studies, it is still significant and concerning that 49.9% of older adults in this study experienced social isolation. In particular, older adults who answered "much" or "very much" in response to "I feel that life is often boring" was 54.6%. Social isolation in older adults is a risk factor known to increase mortality with significant negative physical (heart disease) and mental (cognitive impairment, anxiety, and depression) impacts.[5–8] This study also found that those with age-related hearing loss were more likely to experience social isolation than those without hearing loss, which supports the findings of a previous study[5] that found severe social isolation in age-related hearing loss patients. Due to the rapid increase in the older population in recent years, public interest in social isolation among older adults and measures to reduce

Table 3

Correlations between subjective hearing handicap, communication-related life satisfaction, and social isolation (N = 203).

	Subjective hearing handicap				Communication-related life satisfaction				
	Social	Psycho-emotional	Interpersonal	Perception of hearing aids	Confidence and autonomy	Roles and self	Participation in daily activities	Interaction with others	Quality of life
Variables	***r* (*P*)**	***r* (*P*)**	***r* (*P*)**	***r* (*P*)**	***r* (*P*)**	***r* (*P*)**	***r* (*P*)**	***r* (*P*)**	***r* (*P*)**
Social isolation	.52 (<.001)	.44 (<.001)	.60 (<.001)	.47 (<.001)	−.67 (<.001)	−.77 (<.001)	−.68 (<.001)	−.73 (<.001)	−.51 (<.001)

Table 4

Factors that influenced social isolation (N = 203).

Variables	*B*	SE	β	*t*	*P* value
(constant)					
Religiosity (Ref: yes)	−1.79	.54	−.16	−3.31	.001
Living arrangement	−.62	.58	−.05	−1.07	.287
Perceived health status (Ref: poor)	−.15	.58	−.01	−.27	.791
Total duration of hearing loss (Ref: >12 months)	.62	.58	.06	1.07	.288
Objective hearing function (Ref: very severe)	1.50	1.03	.07	1.45	.148
Experience using hearing aids (Ref: yes)	−1.91	.69	−.15	−2.78	.006
Subjective hearing handicap	.07	.04	.16	2.0	.047
Communication-related life satisfaction	−.22	.03	−.62	−7.18	<.001
F (*p*)			36.10 (<.001)		
R^2			.60		
Adjusted R^2			.58		

B = unstandardized beta, R^2 = *R*-squared or coefficient of determination, SE = standard error.

their social isolation has also increased. Given this context, age-related hearing loss patients, among whom severe social isolation was common, must be considered by public health officials.

In this study, non-religious older adults and older adults who lived alone had the highest level of social isolation. These findings may have been because religion helped older adults with hearing loss overcome the feeling that their lives did not have value in old age. In addition, interacting with peers also likely helped mitigate social isolation experienced by age-related hearing loss patients. Similarly, the participants who lived with others might have experienced relatively less social isolation since they could receive immediate help in solving various issues in daily life. These findings are supported by those of a previous study,[17] which found that religiosity had a positive impact on older adults' perception of the meaning of life and that social interaction was a crucial factor in lowering social isolation in older adults. Along with the rapid increase in the older population in South Korea, the traditional assumption that older adults will always be cared for is changing.[18] Therefore, active interventions involving the expansion of public services at the governmental level may be needed to reduce the social isolation of age-related hearing loss patients.

Social isolation was highest in the participants who had poorer degrees of subjective and objective hearing handicap, who had experienced hearing loss for a longer duration, and who had no experience using hearing aids, among the hearing-related characteristics. Based on these hearing-related variables, the correlation between reduced hearing function and social isolation was found to be similar to that in previous studies.[5–7] In order to assess the objective hearing function of the participants, this study used average pure-tone thresholds, and the subjective hearing handicap of the participants and the perception of discomfort due to hearing loss were measured using the KESHH. Social isolation was found to be significantly higher in older adults with severe hearing loss and with a greater degree of subjective discomfort. Since these 2 methods are highly correlated, hearing function is generally determined using one method.[19] However, age-related hearing loss patients often experience a gradual decrease in average pure-tone threshold and adapt to the situation over time.[5] Moreover, even with the same degree of hearing handicap, each individual may experience a different level of discomfort due to hearing loss. A person might not be aware of hearing loss and not receive proper treatment, resulting in a severe hearing handicap and missed treatment. Therefore, it is crucial to accurately assess and diagnose age-related hearing loss early. To this end, it is critically important to objectively measure patients' hearing ability using a pure-tone threshold assessment; however, this requires reliable audiometric equipment. If making an objective assessment is not possible, the degree of hearing discomfort must first be determined using a subjective hearing handicap assessment scale. The American Speech-Language-Hearing Association recommends using the Hearing Handicap Inventory for the Elderly (HHIE) as a screening test for hearing loss in older adults.[11,20] In South Korea, the KESHH[11] was developed to analyze the level of disability due to geriatric hearing loss; therefore, this scale should be adopted more widely to screen for age-related hearing loss.

In the multiple regression analysis to identify the factors that influenced social isolation in age-related hearing loss patients, communication-related life satisfaction, religiosity, experience using hearing aids, and the subjective hearing handicap were significant contributing factors. In general, people communicate in places where there is background noise or where many other people have gathered rather than in quiet locations. In this context, age-related hearing loss patients experience an even greater inability to perceive speech.[5,21] This decrease in perception leads to lower confidence when communicating, therefore increasing social isolation. This is supported by the finding of this study that the 4 subdomains (confidence and autonomy in communication, roles and self, participation in daily activities, and interaction with others) and quality of life of the Quality of Communication Life Scale were negatively correlated to social isolation.

In a recent study by Lee et al,[22] older adults who had a greater subjective hearing handicap, even when they had the same level of hearing loss, were more sensitive to negative emotional responses such as depression. This study similarly also found patients' subjective hearing handicap level to be a predictor of

social isolation. These results indicate that a significant subjective hearing handicap in daily life increases social isolation and can lead to the development of psychological issues such as depression,[22] which indicates an urgent need for measures to mitigate age-related hearing loss patients' communication difficulties in various environments. In this study, experience using hearing aids was a predictor of social isolation, and social isolation was higher among those who did not have experience using hearing aids than among those who did. This finding is in line with those of a previous study[23] that compared quality of life between older adults suspected of age-related hearing loss and older adults who used hearing aids and found that the use of hearing aids among older adults with hearing loss positively influenced their performance of daily activities, self-satisfaction, and interactions with others. These findings indicate that taking active measures to mitigate hearing loss, including wearing hearing aids, is crucial for age-related hearing loss patients. The proper use of hearing aids can compensate for hearing loss as well as prevent further deterioration of patients' ability to hear.[22,23] Therefore, the use of hearing aids is expected to substantially reduce the degree to which older adults with hearing loss experience social isolation.

This study has limited applicability for generalizing the findings since it was conducted with patients at a single university hospital only. Despite this limitation, this study is significant since it objectively and subjectively assessed the hearing ability of age-related hearing loss patients and analyzed social isolation according to the level of hearing loss and other contributing factors. The findings of this study can be used as a basis for developing interventions to reduce social isolation among age-related hearing loss patients.

5. Conclusion and suggestions

Age-related hearing loss patients experienced a high degree of social isolation, and communication-related life satisfaction was found to be a major factor influencing social isolation in this study. This result suggests that early diagnosis of hearing loss and measures to enhance the communication satisfaction of age-related hearing loss patients are needed to reduce their social isolation.

Therefore, based on the findings of this study, it is essential to develop relationships between hearing rehabilitation programs for older adults with severe hearing loss who have high degrees of social isolation. Furthermore, more integrated hearing rehabilitation programs should be developed to enhance the communication satisfaction of age-related hearing loss patients and reduce their degree of social isolation.

Author contributions

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